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<p>(21) International Application Number: PCT/GB95/01018</p> <p>(22) International Filing Date: 4 May 1995 (04.05.95)</p> <p>(30) Priority Data: 9408800.2 4 May 1994 (04.05.94) GB</p> <p>(71) Applicant (for all designated States except US): IMPACT SYSTEMS (DBA) LIMITED [GB/GB]; 25 Polnoon Street, Eaglesham G76 0BH (GB).</p> <p>(72) Inventors; and (75) Inventors/Applicants (for US only): PENNELL, David, Wilson [GB/GB]; Oat Hill Farm, Snowhill, Worcestershire WR1 7JU (GB). WRAGG, David, Neil [GB/GB]; 90 Austrey Road, Warton, North Tamworth, Warwickshire B79 0HQ (GB). COLEMAN, Clive, Scott [GB/GB]; 65 Goldieslie Road, Sutton Coldfield, West Midlands G73 5PG (GB).</p> <p>(74) Agent: MURGITROYD & COMPANY; 373 Scotland Street, Glasgow G5 8QA (GB).</p>		<p>(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TT, UA, UG, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD, SZ, UG).</p> <p>Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p>
<p>(54) Title: METHOD OF PRESSURISING INSERTS</p> <p>(57) Abstract</p> <p>An insert (10) for releasing pressurised gas into beverage is provided by closing the insert (10) in a gas at super atmospheric pressure, gradually reducing the pressure external to the insert to atmospheric pressure, placing the insert in a container, filling the container with a beverage, sealing the container and causing the gas to escape from the insert on opening the container.</p> <div data-bbox="763 1134 1396 1659"> </div>		

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1 METHOD OF PRESSURISING INSERTS

2

3 This invention relates to a method of providing a
4 pressurised gas in an insert for release into a
5 beverage.

6

7 It is becoming increasingly popular to provide an
8 insert inside a beverage can in which the insert
9 contains a pressurised gas which is released into the
10 beverage when the can is opened.

11

12 A number of methods have been used to provide an insert
13 with a valve means, charged with pressurised gas,
14 positioned in a sealed beverage can.

15

16 In one method, the gas inside the insert can be charged
17 to super-atmospheric pressure at the time of forming
18 the insert and the insert placed in the beverage can in
19 a super- atmospheric atmosphere. This means that there
20 is no pressure differential across a valve of the
21 insert; no gas will escape from the insert which would
22 otherwise cause a lowering of the internal pressure of
23 the insert.

24

1 This method requires major alteration to a canning line
2 to be put into effect as a beverage can containing the
3 charged insert must be kept at super-atmospheric
4 pressure during filling and sealing.

5
6 A second method is to fill the insert with a gas at
7 atmospheric pressure and to increase the pressure of
8 the gas within the insert once it is placed and sealed
9 within the beverage can. An increase in pressure
10 within the insert can be produced by reduction of the
11 volume of the insert or by means of the insert having a
12 gas permeable wall through which gas can enter the
13 insert from the surrounding beverage until the gas
14 pressure within the insert is equal to the pressure of
15 the surrounding beverage.

16
17 These two methods both have disadvantages. The first
18 method necessitates a reduction of the speed of the
19 canning line. The second method requires the insert
20 either to have moving parts or to be formed of a
21 deformable material, the deformation of which may not
22 be uniform across a number of inserts, or to rely on a
23 gas permeable material for transfer of the gas into the
24 insert.

25
26 According to a first aspect, the present invention
27 provides a method of providing a pressurised gas in an
28 insert for release into a beverage comprising the steps
29 of:

- 30 a) providing an insert cap and an insert body which
31 are assemblable to form the insert, the insert cap
32 being provided in a first state in which it has a
33 connection portion and a resilient, substantially
34 arcuate body portion;
35 b) assembling the insert body and the insert cap

1 together by deforming the body portion of the cap,
2 maintaining it in a second, elastically deformed
3 state at the insert body, and fixing the
4 connection portion of the cap to the insert body
5 to form the insert and to seal a gas within the
6 insert.

7
8 According to a second aspect, the present invention
9 provides an insert having a closable orifice for
10 releasing a pressurised gas within a beverage
11 container, the insert comprising an insert cap attached
12 to an insert body in which the insert cap has a first
13 state in which it has a connection portion and a
14 resilient, substantially arcuate body portion and in
15 which the cap is retained at the insert body in a
16 second, elastically deformed state by attachment of its
17 connection portion to the insert body to close the
18 insert.

19
20 The method and apparatus of the present invention
21 cannot be deduced from examination of the insert as
22 provided in a beverage can before, during or after
23 operation of the insert.

24
25 According to a further aspect of the present invention
26 there is provided a method of providing a pressurised
27 gas in an insert for release into a beverage comprising
28 the steps of:

- 29 a) closing the insert in a gas at super-atmospheric
30 pressure;
31 b) gradually reducing the pressure external to the
32 insert to atmospheric pressure;
33 c) placing the insert in a container, filling the
34 container and sealing the container; and
35 d) causing at least some of the gas to escape from

1 the insert on opening the container.

2

3 Preferably, the insert is closed by causing a
4 projection member to block an orifice in the insert.

5

6 Preferably, the insert has a cap which is attachable to
7 an insert body in the form of a cup member, the cap
8 being sprung or resilient such that it will remain
9 attached to the cup member when the insert is filled to
10 super-atmospheric pressure.

11

12 Preferably, the cap is attachable to the cup member by
13 means of a seal which allows variation in the shape of
14 the cap and level of external pressure without breaking
15 the seal.

16

17 Preferably, the projection member is attached to the
18 cup member and the orifice is provided in the cap of
19 the insert.

20

21 Preferably, the gas escapes through the orifice as the
22 cap springs away from the cup member due to a sudden
23 drop in pressure external to the insert.

24

25 Preferably, the insert is formed of a plastics material
26 and the spring or resilience of the cap is reduced
27 slightly during pasteurisation of the container
28 containing the insert.

29

30 According to another aspect of the present invention
31 there is provided a method of providing a pressurised
32 gas in an insert for release into a beverage comprising
33 the steps of closing a sprung or resilient cap onto a
34 cup member to enclose a gas at a super-atmospheric
35 pressure within the insert and subsequently reducing

1 the external pressure to atmospheric pressure without
2 substantial escape of the gas from inside the insert.

3
4 Preferably, the cap contains an orifice which, when the
5 cap is attached to the cup member, is closed by a
6 projection member projecting from the cup member.

7
8 Preferably, the cap is sprung such that the orifice
9 springs away from the projection member when the insert
10 is position in a sealed, pressurised container and the
11 pressure external to the insert is reduced suddenly to
12 atmospheric pressure, for example, by broaching the
13 container.

14
15 Embodiments of the present invention will now be
16 described with reference to the accompanying drawings
17 in which:

18
19 Fig 1 is a cross-section of the components of an
20 insert in accordance with the present invention,
21 before assembly;

22
23 Fig 2 is a cross-section of the insert of Fig 1
24 when assembled; and

25
26 Fig 3 is a cross-section of the insert of Fig 1
27 during operation of the insert on opening a
28 beverage container in which the insert is
29 disposed.

30
31 Referring to the drawings, a diagrammatic cross section
32 of the insert 10 is shown in Fig 1. The insert has two
33 opposing walls 1,2. The first wall 1, which is
34 disposed at the top of the insert 10, has an orifice 3
35 in its centre. The orifice 3 has a surround 4 which

1 co-operates with a top 5 of a projection member in the
2 form of a stem 6 which projects from an internal face 7
3 of the second wall 2.

4

5 The first wall 1 is in the form of a cap 8 which clips
6 onto an insert body in the form of a cup shaped member
7 9 of which the second wall 2 is the base.

8

9 Prior to assembly of the cap 8 onto the cup shaped
10 member 9, the cap 8, when not subjected to external
11 forces, has a body portion having a curved, convex or
12 arcuate form such that its centre, at which orifice 3
13 is positioned, curves inwardly in relation to the
14 surrounding rim 12 of the cap 8.

15

16 The cap 8 is formed of a resilient material and clips
17 onto the cup member 9 with an interference fit between
18 the rim 12 of the cap 8 (which provides a connection
19 portion) and the rim 13 of the cup member 9.

20

21 The insert 10 is designed such that the composite
22 height h1 of the projecting stem 6 and the orifice
23 surround 4 is of greater height than the distance h2
24 between the two walls 1,2 at their circumferences
25 including the fully extended inter-locking join of the
26 cap 8 to the cup member 9. This means that the first
27 wall 1 is forced to curve around the stem 6 in a
28 concave manner when the cap 8 is pressed onto the cup
29 member 9 and the top 5 of the stem 6 is forced against
30 the surround 4 of the orifice 3 thereby closing the
31 orifice 3.

32

33 The resilience of the cap 8 of the insert 10 is such
34 that the insert 10 can be assembled under a pressure of
35 approximately 34 psi and the cap 8 forced onto the cup

1 member 9 enclosing the gas at a pressure of 34 psi
2 within the insert 10.

3
4 The pressure external to the insert 10 is reduced
5 slowly to atmospheric pressure and the resilience or
6 spring of the cap 8 of the insert 10 is such that
7 substantially no gas escapes from the orifice 3 even
8 though there is a large pressure difference between the
9 pressures inside and outside the insert 10.

10
11 It is important to ensure that the cap 8 does not pop
12 off inadvertently due to the resilience or spring of
13 the cap 8 not being sufficient. Alternatively, if the
14 resilience or spring of the cap 8 is too strong,
15 operation of the insert 10 will be impaired. The
16 resilience of the cap 8 is determined by the dimensions
17 of the cap and flexibility and nature of the material
18 from which it is made.

19
20 The insert 10 is inserted into the can and the can is
21 filled with a beverage and sealed. After sealing, the
22 can is pasteurised. During pasteurisation the pressure
23 of the beverage inside the can rises considerably due
24 to the rise in temperature. The pressure inside the
25 insert 10 also rises due to the increase in temperature
26 of the gas; however, due to the fact that the pressure
27 of the beverage external to the insert 10 is greater
28 than the internal pressure of the insert 10, no gas
29 escapes from the insert 10 during this time.

30
31 When the plastics material of which the insert is made
32 is heated, as occurs during pasteurisation, it creeps
33 slightly and as it is under pressure the cap 8 creeps
34 more into the position it is held in by the external
35 pressure in relation to the cup member 9. Due to the

1 creep in the plastics material, the resilience or
2 spring of the cap 8 is weakened a little but, once
3 cooled, the pressure external to the insert 10 is
4 sufficient to ensure that the orifice 3 remains closed
5 until the beverage can is opened.

6
7 When the can is cooled after pasteurisation the
8 pressure within the insert 10 falls back to its
9 original filling pressure of approximately 34 psi. The
10 pressure in the beverage external to the insert 10
11 remains at a higher pressure enabling the cans to be
12 transported without risk of the gas escaping from the
13 insert 10.

14
15 When the can is opened, the pressure in the beverage
16 surrounding the insert 10 drops suddenly to atmospheric
17 pressure. This sudden drop in pressure causes the
18 resilient cap 8 of the insert 10 to spring away from
19 the stem 6 which projects from the second wall 2 of the
20 insert 10 thus allowing some gas to escape through the
21 orifice 3. The seal between the cap 8 and the cup
22 member 9 must be sufficiently strong to prevent the cap
23 8 coming away from the cup member 9 during this
24 decrease in external pressure. Not all the gas escapes
25 through the orifice 3 as the cap 8 of the insert 10
26 quickly springs back to rest on the stem 6. This means
27 that some pressurised gas remains in the insert 10.

28
29 Due to the fact that the operation of the insert 10
30 depends on the resilience or spring of the cap 8 of the
31 insert 10, the dimensions of the cap 8 are extremely
32 important. Also, the seal between the cap 8 and the
33 cup member 9 of the insert 10 is very important and a
34 slight ridge 11 on the internal circumference of the
35 cap 8 is provided which acts against the rim 13 of the

1 cup member 9 holding the seal between the cap 8 and the
2 cup member 9 together even when the cap 8 is tensioned
3 and is curved around the stem projection 6.

4

5 This operation may vary slightly in that the base of
6 the cup member 9 may curve outwardly as well as or in
7 place of the cap 8.

8

9 Modifications and improvement may be made without
10 departing from the scope of this invention.

11

1 CLAIMS

2

3 1. A method of providing a pressurised gas in an
4 insert (10) for release into a beverage comprising
5 the steps of:

6

7 a) providing an insert cap(1) and an insert body
8 (2) which are assemblable to form the insert
9 (10), the insert cap (1) being provided in a
10 first state in which it has a connection
11 portion and a resilient, substantially
12 arcuate body portion;

13 b) assembling the insert body (2) and the insert
14 cap (1) together by deforming the body
15 portion of the cap (1), maintaining it in a
16 second, elastically deformed state at the
17 insert body (12), and fixing the connection
18 portion of the cap (1) to the insert body (2)
19 to form the insert and to seal a gas within
20 the insert.

21

22 2. A method in accordance with Claim 1 in which the
23 insert is assembled with an initially convex
24 surface of the body portion of the cap (1)
25 arranged towards the insert body.

26

27 3. A method in accordance with Claim 1 or Claim 2 in
28 which the insert is closed by causing a projection
29 member (6) to block an orifice (3) of the insert.

30

31 4. A method in accordance with Claim 3, in which the
32 projection (6) member is attached to the insert
33 body (2) and the orifice (3) is provided in the
34 cap (1).

35

36 5. A method in accordance with any preceding claim in

1 which the insert body (2) is provided in the form
2 of a cup shaped member.

3
4 6. A method in accordance with any one of Claim 3 to
5 5 in which the cap (1) is deformed around the
6 projection member (6) upon being assembled with
7 the insert body (2), the projection member (6)
8 acting against the cap (1) to cause it to assume
9 its second state when attached to the insert body
10 (2).

11
12 7. A method in accordance with any preceding claim in
13 which the insert (10) is assembled in a gas at
14 super atmospheric pressure to seal a gas at super
15 atmospheric pressure within the insert.

16
17 8. A method in accordance with Claim 7 in which once
18 the insert (10) has been sealed the pressure
19 around the insert is reduced to atmospheric
20 pressure and the resilience of the cap (1) causes
21 it to be retained at the insert body (2) to
22 prevent substantial release of pressurised gas
23 from the insert until such release is desired.

24
25 9. A method in accordance with any preceding claim
26 comprising the further steps of:
27 c) placing the insert (10) in a container,
28 filling the container with a beverage and
29 sealing the container;
30 d) increasing the temperature of the insert (10)
31 within the container.

32
33 10. A method in accordance with Claim 9 in which the
34 temperature of the insert (10) within the
35 container is raised by subjecting the container
36 and the beverage therein to a pasteurisation

1 process.

2

3 11. A method in accordance with Claim 9 or Claim 10 in
4 which increasing the temperature of the insert
5 (10) causes a relaxation of the resilience of the
6 cap (1).

7

8 12. A method in accordance with Claim 9 or Claim 10 in
9 which increasing the temperature of the insert
10 (10) causes plastic deformation of the cap (1).

11

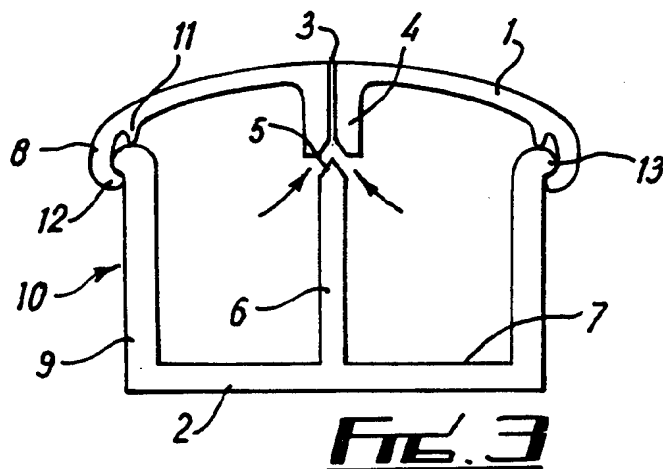
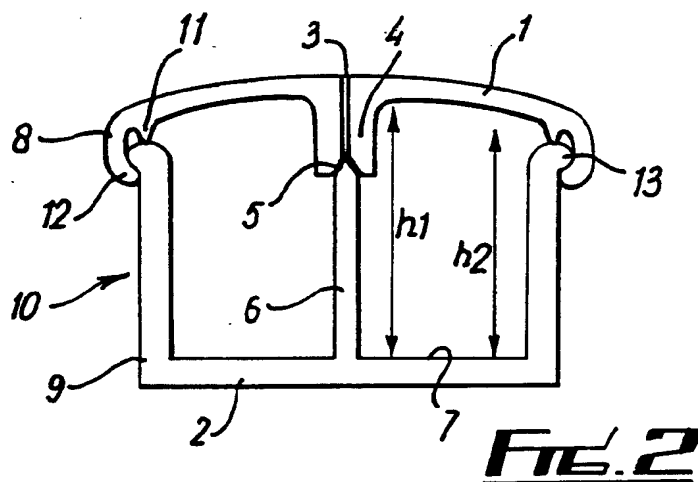
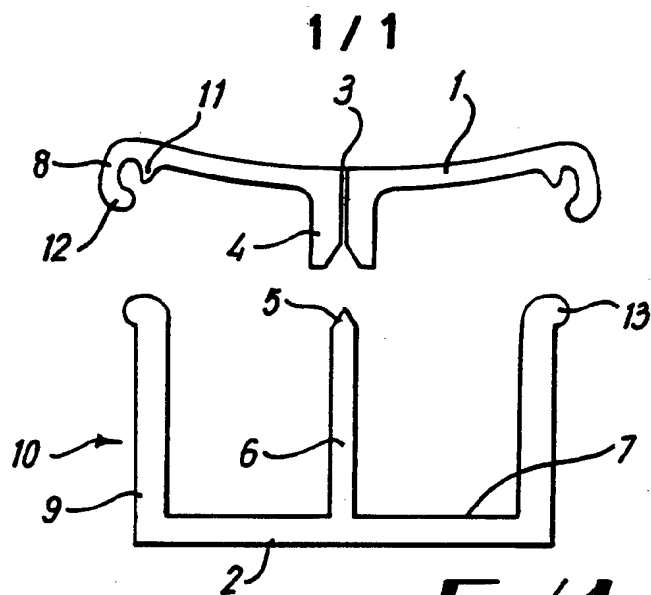
12 13. A method in accordance with any one of Claims 9 to
13 12 in which raising the temperature of the insert
14 (10) causes the cap (1) to assume a third,
15 relaxed, state at which it is maintained at the
16 insert body (2) and in which state reduction of
17 pressure externally of the insert to substantially
18 atmospheric pressure cause the cap (1) to deform
19 causing gas to be released from inside the insert
20 (10).

21

22 14. A method in accordance with any preceding claim in
23 which the insert (10) is formed, at least in part,
24 of the thermally modifiable plastics material.

25

26 15. An insert (10) having a closable oriface (3) for
27 releasing a pressurised gas within a beverage
28 container, the insert comprising an insert cap (1)
29 attached to an insert body (2) in which the insert
30 cap (1) has a first state in which it has a
31 connection portion and a resilient substantially
32 arcuate body portion and which the cap (1) is
33 retained at the insert body (2) in a second,
34 elastically deformed state by attachment of its
35 connection portion to the insert body (2) to close
36 the insert (10).



INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 95/01018

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 B65D79/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO-A-92 00896 (PRICE DEV LTD E J) 23 January 1992 see page 6, line 22 - line 34; figure 5 ---	1-5,7, 9-11,14, 15
A,P	WO-A-95 04689 (SMITHKLINE BEECHAM PLC ;GILES GEOFFREY ALAN (GB)) 16 February 1995 see abstract; figure 1 ---	1,15
A	EP-A-0 594 221 (WHITBREAD PLC ;HEINEKEN TECH SERVICES (NL)) 27 April 1994 see the whole document ---	1,15
A,P	WO,A,94 15871 (CARLSBERG TETLEY BREWERY LTD) 21 July 1994 see the whole document -----	1,15

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

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Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

International Application No
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A-9200896	23-01-92	AU-A- 8109691 EP-A- 0537238	04-02-92 21-04-93
WO-A-9504689	16-02-95	NONE	
EP-A-0594221	27-04-94	CN-A, B 1054399 EP-A- 0502059 WO-A- 9107326 HU-A- 67378	11-09-91 09-09-92 30-05-91 28-04-95
WO-A-9415871	21-07-94	AU-B- 5713194	15-08-94